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Superconductivity in $Nb_3Pd_{0.75}Se_7$ DANIEL RHODES, QIU ZHANG, BIN ZHENG, GANG LI, ANDHIKA KISWANDHI, TIGLET BESARA, THEO SIEGRIST, LUIS BALICAS, National High Magneti Field Lab — Here, we report the discovery of superconductivity in the transition metal chalcogenide $Nb_3Pd_{0.75}S_7$ with a transition temperature $T_c = 1.9$ K. In extremely thin, needle like single crystals we observe upper critical fields $H^b_{c2}(T \to 0 \text{ K}) \simeq 14$ T for fields directed along the needle axis, or the crystallographic b-axis. This value is 4 times larger than the expected weak coupling Pauli limiting field. For fields applied along two directions perpendicular to the b-axis, we observe considerably smaller but anisotropic upper critical fields. For fields along and perpendicular to the b-axis we observe a temperature-dependent anisotropy $\gamma = H^b_{c2}/H^{\perp b}_{c2}$ as large as 6 (as $T \to T_c$). This behavior suggests that this compound is a multi-band superconductor. The low symmetry of its crystallographic structure implying low electronic dimensionality, coupled to multi-band behavior and very high upper critical fields, suggests an unconventional superconducting ground-state.

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